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ON LARVAE OF THE NOCTUIDAE (LEPIDOPTERA)—IV.

By J. C. M. Gardner, C.I.E., F.R.E.S.

(*Forest Research Institute, Dehra Dun, U.P., India.*)

Manuscript received 24th March, 1947.

(Read 2nd June, 1948.)

With 31 Text Figures.

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This paper, now concluded, is intended primarily as a means of identifying a number of Noctuid larvae representing a small proportion of the species recorded from India. The arrangement in four Divisions is largely artificial, and there is little doubt that further studies will lead to a more scientific classification.

An important paper by Dr. H. E. Hinton (1946, *Trans. R. ent. Soc. Lond.* **97** : 1-37) proposes what appears to be the first really satisfactory nomenclature for the setae of lepidopterous larvae; unfortunately this appeared too late for use in my paper.

For the nomenclature of the adults I have been almost entirely dependent on Hampson's Phalaenae.

Division C.

Mature larvae with the following combination:

Ventral prolegs complete and equal or only gradually reduced from A 6 to A 3. Seta III on A 8 usually anterior to spiracle, but if vertically above, VII is trisetose on A 1. Setal group VII bisetose or trisetose, rarely unisetose. Spinneret never short and truncate as it is in some genera of Division A.

In one or two genera the anterior prolegs are rather more noticeably reduced than is usual in this division, although they are scarcely "abruptly" reduced as they are in Group B IV*c*. *Labanda* with III very nearly vertically above the spiracle on A 8 might have been included in Division A except for its strongly heteroideous crochets.

The division includes: Euteliinae (7 genera), Sarrothripinae (8 genera), Stictopterinae (2 genera), Catocalinae and Noctuinae (part; other genera, with reduced anterior prolegs, are in Division B), Herminiinae (7 genera) also *Westermannia* (Acontiinae) and two genera of the Amphipyrinae (most of which are in Group A II) namely *Sesamia*, with III on A 8 well anterior to the spiracle, and *Iambia* with VII trisetose on A 1.

Key to larvae of Division C.

1. Frontal setae well above level of frontal pores, sometimes half-way up the frons. Ocellus 2 about half-way between 1 and 3. Setae long, at most on weak basal pimples; VII bisetose on A 1, trisetose on A 2. Small larvae up to about 20 mm. long *Sarrothripus* group.
   Without that combination . . . . . 2.
2. Head (except sometimes frons) closely granulate, usually with dark reticulation. Body closely covered with fine to moderate ribbed granules (figs. 22, 24). Body setae on small brown weakly or strongly convex plates, sometimes on quite strong protuberances; VII on A 1 and A 2 is trisetose (rarely bisetose). Small larvae Herminiinae.
   Without that combination . . . . . 3.
3. Crochets heteroideous (sometimes with only four or five vestigial crochets at each extremity of the mesoseries) . . . . . 4.
   Crochets homoideous . . . . . 9.
4. Most body setae each on a small brown plate (less distinct for I, II on middle segments) . . . . . *Anigraea albomaculata* Hampson.
   Setae not on such plates . . . . . 5.
5. Body setae rather long; III on A 8 nearly vertically above the spiracle. (Functional crochets occupying about the middle third of each mesoseries. Body with conspicuous black markings) *Labanda semipars* Walker.
   Setae short or rather short; III on A 8 more anterior . . . . . 6.
6. Coronal suture not longer than frons . . . . . 7.
   Coronal suture distinctly longer than frons . . . . . 8.
7. Head nearly smooth. Frons distinctly higher than wide. Mandible with no internal tooth . . . . . *Odontodes aleuca* Guenée.
   Head irregular. Frons about as high as wide. Mandible with strong internal tooth . . . . . *Fodina stola* Guenée.
8. Labral emargination wide. Vestigial crochets occupying about half of a mesoseries. . . . . *Paectes subapicalis* Walker.
   Labral emargination abrupt and acute. Vestigial crochets much less extensive . . . . . *Anuga multiplicans* Walker.
9. Seta III on A 8 vertically above the spiracle.
   VII trisetose on A 1 . . . . . 10.
   Seta III on A 8 more cephalad; when only slightly cephalad, VII is bisetose on A 1 . . . . . 13.
10. Spinneret very long, slenderly tapering. Body setae rather long, mostly on small pimples . . . . . *Cocytodes coerulea* Guenée.
    Spinneret less elongate. Body setae short, not raised basally . . 11.
11. Ocelli 1 to 4 well separated, the space between 3 and 4 more than the diameter of 4. (Head and body without dark maculation except that setal rings of head are blackish) . . *Iambia thwaitesi* Moore.
    Ocelli 1 to 4 more closely spaced. (Head and body with much dark maculation) . . . . . 12.
12. Mandible with no internal tooth. (Labral emargination more obtuse) *Catephia inquieta* Walker.
    Mandible with strong internal rectangular tooth. (Labral emargination approximately right angled) . . . . . *Anophia leucomelas* L.
13. Labral emargination at least nearly half deep . . . . . 14.
    Labral emargination much less than half deep . . . . . 17.

14. Body setae long, on conspicuous tubercles. (VII trisetose on A 1) 15.
Setae short. (VII bisetose on A 1) . . . . . 16.
15. Body setae fine, on moderate tubercles. Labral emargination moderately acute, not more than half deep. Prolegs of A 3 distinctly smaller than of A 5. Head not distinctly granulate
Coarica fasciata Moore.
Setae bristle-like, on strong corneous tubercles. Labral emargination very acute and more than half deep. Ventral prolegs nearly equal. Head granulate . . . . . *Episparis tortuosalis* Moore.
16. Head coarsely granulate in part. Pygidium not granulate
Westermannia spp.
Head not granulate. Pygidium finely granulate anteriorly *Risoba* spp.
17. Seta III on A 8 unusually low, nearly anterior to middle height of spiracle. . . . . *Chlumetia transversa* Walker.
Seta III on A 8 not below level of upper extremity of spiracle . . 18.
18. Frons about as high as wide.[1] (VII is trisetose on A 1) . . . . . 19.
Frons distinctly higher than wide . . . . . 23.
19. Frons small, much shorter than coronal suture . . . . . 20.
Frons never much shorter than coronal suture . . . . . 21.
20. Frons slightly higher than wide. Body with dark pigment *Hypocala* spp.
Frons not higher than wide. Body without dark pigment
Mecodina cineratia Butler.
21. Head above with well defined coarse granules. (Frons about as long as coronal suture. Ocellus 2 very close to 1, more distant from 3)
Attatha regalis Moore.
Head at most very finely granulate. (Ocellus 2 only slightly closer to 1 than to 3). . . . . 22.
22. Frons slightly longer than coronal suture. Mandible elongate, without internal tooth . . . . . *Plecopterodes pulchra* F.
Frons slightly shorter than coronal suture. Mandible with strong internal tooth . . . . . *Fodina pallula* Guenée.
23. Head coarsely granulate-rugulose. (Ocellus 2 about half-way between 1 and 3) . . . . . *Pandesma quenavadi* Guenée.
Head, if granulate, not coarsely rugulose . . . . . 24.
24. Head above with well defined coarse granules. Ocellus 2 not nearer 1 than 3. Frons not much shorter than coronal suture
Episparis liturata F.
Without that combination . . . . . 25.
25. Ocellus 2 well separated from 1 and at most slightly closer to 1 than to 3 . . . . . 26.
Ocellus 2 much closer to 1 than to 3 . . . . . 27.
26. VII is bisetose on A 1. Frons shorter than coronal suture and distinctly higher than wide . . . . . *Sesamia inferens* Walker.
VII is trisetose on A 1. Frons slightly longer than coronal suture, slightly higher than wide. . . . . *Plecopterodes pulchra* F.
27. VII is bisetose on A 1, trisetose on A 2 . . . . . 28.
VII trisetose on A 1 and on A 2 . . . . . 30.
28. Frons slightly longer than coronal suture. Mandible without internal armature . . . . . *Lophoptera* spp.
Frons usually shorter than coronal suture. Mandible with distinct internal tooth . . . . . 29.

[1] *Plecopterodes* and *Hypocala* will run down under either alternative.

29. Mesothorax with a dorsal row of six conspicuous black spots, each containing a seta on a white dot. (Frons much shorter than coronal suture. Seta III on A 8 well above spiracle, slightly more anterior). . . . . *Blenina quinaria* Moore.
Mesothorax without such spots. (Head with fine granulation) EUTELIINAE (part).
30. Seta V on A 1 is far cephalad of spiracle. (Mandible with complex internal armature) . . . . . *Polydesma umbricola* Boisduval.
Seta V on A 1 nearly directly below the spiracle . . . . . 31.
31. Frons much shorter than coronal suture. III on A 8 nearly directly anterior to upper extremity ofspiracle . . . . . *Hypocala* spp.
Frons about as long as coronal suture. III on A 8 well above level of spiracle . . . . . *Anticarsia irrorata* F.

AMPHIPYRINAE.

Iambia thwaitesi Moore.

Ventral prolegs complete, the two anterior pairs rather markedly reduced, crochets uniordinal. Setae short, not on pimples; VII is trisetose on A 1 and on A 2; III on A 8 is vertically above the spiracle; no secondaries or verrucae. Frons higher than wide, rather broadly rounded at apex, moderately shorter than coronal suture; frontal setae a little above level of pores. Ocellus 2 well separated from 1, but rather nearer that than 3; 3 and 4 widely separated. Labral emargination a shallow, almost semicircular curve. Mandible with three strong apical teeth on ventral part of distal margin, dorsal part of edge nearly even; internal face with a large transverse plate (produced at one end), and imposed on the latter a fairly large obtuse tooth. Spinneret moderately elongate (extending nearly to apex of the rather long apical seta of palp), bilobed at the wide apex. Skin smooth. Length 25 mm. Head yellowish green with the setal rings black; body green, with a yellow subdorsal line on each side and with numerous irregular yellow spots above; spiracles brown.

Larvae on *Gouania leptostachya*; Dehra Dun. (Moth identified by W. H. T. Tams.)

Sesamia inferens Walker.

Isaac and Rao, 1941, *Indian J. agric. Sci.* **11** : 801.

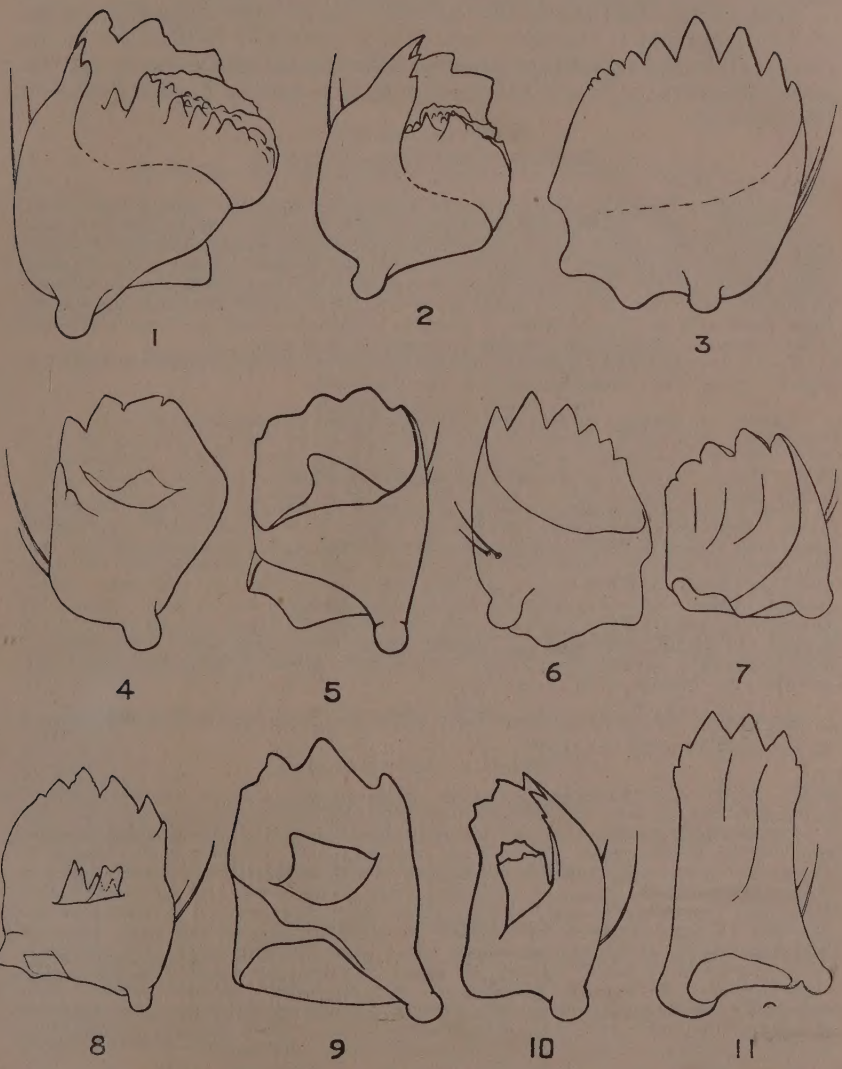
Head smooth or nearly so. Frons narrow apically, higher than wide and shorter than coronal suture; the setae and pores nearly level. Ocellus 2 about half way between 1 and 3. Labral emargination wide and very shallow. Mandible (fig. 7) with five sharp teeth, one of them small; there is no internal tooth. Spinneret as in fig. 27. Basal segment of labial palp short. Body setae short; group VII bisetose on A 1, trisetose on A 2; III on A 8 is well anterior to the spiracle and only slightly above its level. Prolegs short. Length about 25 mm.

Head reddish testaceous; pronotum testaceous; body pink; spiracles with fine black rims.

Described from larvae provided by the Imperial Agricultural Research Institute, New Delhi; the larvae are borers in sugarcane. The species belongs to the AMPHIPYRINAE, but differs from larvae of that subfamily that I have examined in seta III, being well anterior to the spiracle on segment A 8, instead of being vertically above it. Two other Amphipyrine larvae with III anterior to the spiracle on A 8, and also stem borers, have been described from the U.S.A., as I have noted when discussing my Division A (Gardner 1946*b* : 237).

EUTELIINAE.

Ventral prolegs complete and equal. Crochets uniordinal, usually homoideus, but heteroideus in *Anigraea* Walker, *Anuga* Guenée, and *Paectes* Hübner. Setae short, not raised basally; VII usually bisetose on A 1 but unisetose in *Chlumetia* Walker and trisetose in



FIGS. 1–11.—Mandible in internal view: 1, *Pandesma quenavadi*; 2, *Polydesma umbricola*; 3, *Lophoptera costata*; 4, *Sarrothripus reveyana*; 5, *Westermannia superba*; 6, *Chlumetia transversa*; 7, *Sesamia inferens*; 8, *Plagiograpta macrodonta*; 9, *Cocytodes coerulea*; 10, *Fodina stola*; 11, *Plecopterodes pulchra*.

Anigraea; III on A 8 varies from well below the level of the top of the spiracle (*Chlumetia*) to almost vertically above the spiracle. Spinneret moderately elongate, nearly parallel sided, not narrowed at apex. Spiracles narrow.

Food plants.—Most species feed on leaves (but *Chlumetia* tunnels in shoots) of ANACARDIACEAE; exceptions are *Paectes subapicalis* Walker on *Shorea robusta* (DIPTEROCARPACEAE), *Anigraea albomaculata* Hampson on *Garuga pinnata* (BURSERACEAE) and *Phlegetonia delatrix* Guenée on *Eugenia jambolana* (MYRTACEAE).

Anigraea albomaculata Hampson.

Gardner 1941 : 275.

Head faintly irregular. Frons distinctly higher than wide and slightly longer than coronal suture; setae slightly above pore level. Ocellus 2 close to 1, distant from 3. Labral emargination a wide shallow curve. Mandible with three larger distal teeth and two angulations; with strong triangular internal tooth. Spinneret elongate, bilobed at apex. Basal segment of labial palp very long. Body setae short, not raised, mostly on small brown pinacula; VII is trisetose on A 1 and A 2; III on A 8 is anterior to spiracle and slightly below the level of its upper extremity. Crochets heteroideous, each mesoseries with six or seven vestigial crochets at each extremity. Length about 20 mm.

Head testaceous brown; pronotum, pinacula and legs dark brown; spiracles pale ochreous with fine black rims; body skin not definitely pigmented.

Larvae on *Bursera serrata* and *Garuga pinnata* (BURSERACEAE).

Anuga multiplicans Walker.

Head (except frontal region) closely granulate, some granules very fine, some rather coarse. Frons small, higher than wide, less than half as long as coronal suture; setae slightly above level of pores. Ocellus 2 distinctly closer to 1 than to 3. Labral emargination (fig. 13) acute (but narrowly rounded at apex), about a third deep. Mandible with two blunt teeth near middle of distal margin and some indistinct angulations; with strong obtuse internal tooth. Spinneret moderately long, parallel sided, bilobed at apex. Body setae moderate, not raised; VII is bisetose on A 1, trisetose on A 2; III on A 8 well above level of spiracle and slightly more anterior. Crochets heteroideous, about eight or nine vestigial at each extremity. Length about 25 mm. Two larvae in alcohol are colourless except brown spiracles; the original colour probably green.

Larvae on *Semecarpus anacardium* (ANACARDIACEAE); moths were reared at a field laboratory in Coorg.

Chlumetia transversa Walker.

Frons higher than wide, acute at apex, about equal in length to coronal suture, the setae above the level of the pores. Ocellus 2 well removed from 1, but closer to that than to 3. Labral emargination (fig. 12) obtuse and shallow. Mandible (fig. 6) with six sharp teeth and without internal tooth. Spinneret about three times as long as wide, not narrowed apically. Body setae very short, not raised basally; group VII is unisetose on A 1, bisetose on A 2 (fig. 20); IV below the level of the spiracle on abdominal segments and nearly vertically below on A 8; III above the spiracle on A 1 to A 7, but unusually low on A 8, where it is nearly anterior to the middle height of the spiracle (fig. 21); the minute IIIa below spiracular level on A 8. Legs and prolegs short. Spiracles narrow, the sides parallel. Skin extremely finely granulate. Length about 20 mm. Head dark testaceous; pronotum pale testaceous with darker dots; body dull violaceous above, greenish beneath; spiracles with fine brown margins. (Younger instars with head and pronotum black.)

Larvae tunnel in young shoots of *Mangifera indica*; Dehra Dun.

Paectes subapicalis Walker.

Gardner 1941 : 275.

Head finely and closely granulate. Frons small, shorter than coronal suture. Labra emargination rather shallow, approximately right angled. Mandible dentate distally and with arge obtuse internal tooth. Spinneret moderately elongate, parallel sided, bilobed at apex.

Setae short and inconspicuous above, longer laterally; VII bisetose on A 1, trisetose on A 2; III on A 8 nearly directly anterior to upper extremity of spiracle. Crochets (fig. 16) strongly heteroideous, the vestigial crochets constituting about one half of the mesoseries. Length about 25 mm. Head, pronotum and pygidium yellowish; body green or pink with fairly distinct white lines.

Larvae defoliate *Shorea robusta* (DIPTEROCARPACEAE); Dehra Dun.

EUTELIINAE (part).

Bombotelia Hampson, *Eutelia* Hübner, *Phlegetonia* Guenée.

Head with fine to extremely fine granulation. Frons higher than wide. Ocellus 2 very close to 1, more distant from 3. Labral emargination less than half deep. Mandible with distal margin dentate and with an obtuse internal tooth. Spinneret (fig. 26) moderately elongate, nearly parallel sided, bilobed at apex. Body setae short, inconspicuous, not raised basally; VII is bisetose on A 1, trisetose on A 2; III on A 8 from nearly vertically above the spiracle to well anterior. Prolegs equal; crochets homoideous. Spiracles rather large, narrow.

Larvae feed on ANACARDIACEAE except *Phlegetonia delatrix*.

Eutelia sinuosa Moore.

Head granulation partly reticulate with smooth interspaces. Frons much shorter than coronal suture. Labral emargination (fig. 14) abrupt, acute. Seta III on A 8 well above spiracle, but a little more anterior. Head, prothorax and a spiracular line bright yellow; dorsal surface white with four dark transverse lines on each segment, ventral surface colourless. The body turns deep blue before pupation. Length about 30 mm.

The larvae feeds on leaves of *Spondias mangifera*; Dehra Dun.

Eutelia favillatrix Walker.

Frons much shorter than coronal suture. Labral emargination abrupt, acute. Seta III on A 8 well above spiracle but more anterior. Larva pale green with yellow dots; spiracles red. Length about 25 mm.

Larvae on leaves of *Lannea grandis*; Dehra Dun.

Eutelia blandiatrix Boisduval.

Frons not very much shorter than coronal suture. Labral emargination obtuse. III on A 8 well above spiracle and more anterior. Head and body pale green speckled with white; two paradorsal white lines; spiracles red bordered by white. Length about 30 mm.

Larvae eat the flowers of *Mangifera indica*; Dehra Dun.

Bombotelia jocosatrix Guenée.

Structurally similar to *Eutelia blandiatrix*. Pale green, the setae on small dark reddish spots; spiracles reddish. Length about 25 mm.

Larvae were reared from leaves of *Schinus terebinthifolius* and *Mangifera indica*; Dehra Dun.

Phlegetonia delatrix Guenée.

Frons distinctly shorter than coronal suture. Granulation of head very fine and obscure. Labral emargination shallow and very obtuse. Seta III on A 8 anterior to spiracle and nearly directly anterior to its upper extremity (and so lower than in the other) associated species. Head tinged with yellow; body pale green without cuticular pigment; spiracles pale red. Length about 35 mm.

Larvae feed on leaves of *Eugenia jambolana* (MYRTACEAE).

Stictopterinae.

Ventral prolegs complete and equal. Crochets uniordinal. Setae short, not raised basally; III on A 8 well cephalad of the spiracle. Ocelli 1 and 2 approximate. Mandible with no internal tooth. Head with frons higher than wide, acute at apex; not shorter than coronal suture. Spinneret subparallel, elongate, blunt at apex. Body skin smooth.

The two genera examined differ as follows: in *Lophoptera* Guenée VII on A 1 is bisetose and the crochets are homoideous; in *Odontodes* Guenée VII on A 1 is trisetose and the crochets are heteroideous.

Lophoptera Guenée.

Head without distinct granulation, nearly smooth. Frons slightly longer than coronal suture; the setae nearly level with pores. Ocellus 2 very close to 1 and distant from 3. Labral emargination obtuse, nearly a third deep. Mandible with ten distal teeth, the ventral four larger, the others graded to very small; there is no internal tooth. Spinneret subparallel sided, bluntly rounded at apex, extending nearly to apex of distal seta of labial palp. Body setae short, not raised basally; VII bisetose on A 1, trisetose on A 2; III on A 8 well anterior to spiracle. Crochets homoideous.

Lophoptera illucida Walker.

Seta III on A 8 nearly directly anterior to upper extremity of spiracle, only slightly higher. Head testaceous with a thick black band from near antenna to near coronal suture on each side; body black laterally, the black continued across the dorsum on A 1 to A 3, A 7 and posterior segments (pygidium black with yellow spots); the dorsal surface otherwise yellow, setae on yellow dots; legs pale; prolegs pale but brownish apically; spiracles with fine brown rims. Length about 30 mm.

Larvae on *Shorea robusta* (Dipterocarpaceae).

Lophoptera costata Moore.

Seta III on A 8 higher than in *illucida*; larva pale green, without cuticular pigment. Length about 35 mm. Mandible as in fig. 3.

Larvae on *Mallotus philippinensis* (Euphorbiaceae).

Odontodes aleuca Guenée.

Head smooth. Frons higher than wide, acute at apex and slightly longer than coronal suture; the setae very slightly above the pores. Ocellus 2 very close to 1, distant from 3. Labral emargination obtuse, less than a third deep. Mandible with distal margin dentate, some of the teeth large, some small; without internal teeth. Spinneret subparallel, elongate, blunt apically. Body setae short; VII is trisetose on A 1 and A 2; III on A 8 anterior to spiracle and slightly above its level. Crochets heteroideous, but only four or five crochets at the extremities are vestigial. Length about 30 mm. Green, with small white spots above.

Larvae on *Shorea robusta* (Dipterocarpaceae); Dehra Dun.

Acontiinae.

Westermannia Hübner.

Head coarsely granulate in part. Frons small, much shorter than coronal suture and nearly as wide as high; frontal setae slightly above level of pores. Ocellus 2 closer to 1 than to 3. Labral emargination (fig. 15) half deep or more (measured to an imaginary line between distal extremities of tormae). Mandible (fig. 5) rather weakly dentate distally; with distinct internal tooth. Spinneret elongate, slightly tapering, subtruncate at apex. Body setae moderately long, very slightly raised at base; III on A 8 nearly directly anterior to upper extremity of spiracle; VII bisetose on A 1, trisetose on A 2. Skin smooth. Spiracles narrowly elliptical, of A 7 slightly smaller than A 8.

Larvae on leaves of Combretaceae (*Terminalia*, *Anogeissus*).

Westermannia superba Hübner has the labral emargination about half deep. Green; some head setae on small black dots; a fine yellow line dorsolaterally along each side of body and head, setae on yellow dots. Length about 35 mm.

Reared from *Terminalia tomentosa*, *T. myriocarpa*, *T. paniculata*, *Anogeissus leiocarpa* in Dehra Dun.

Westermannia coelisigna Hampson has the labral emargination deeper than in *superba*. Colour much as in *superba* (see also Gardner, 1941 : 281).

Feeds on *Terminalia belerica*, Dehra Dun.

Sarrothripinae.

Blenina quinaria Moore.

Head nearly smooth. Frons distinctly higher than wide, rounded at apex, much shorter than coronal suture; frontal setae slightly above level of pores. Ocellus 2 closer to 1 than to 3. Labral emargination a wide shallow curve. Mandible short and wide, the distal margin almost entire; with a strong internal tooth. Spinneret moderately long, tapering to rounded apex. Body setae rather short, not raised basally; VII bisetose on A 1, trisetose on A 2; III on A 8 well above spiracle but slightly more anterior. Length about 40 mm.

General colour apple green; body with several yellow stripes, each bordered by fine red lines; mesothorax slightly tumid above and with a transverse row of six thick black circles, each enclosing a seta on a white dot; legs reddish distally; prolegs green with a fine reddish band distally, spiracles brown.

Larvae defoliate *Pterocarya stenoptera* in Dehra Dun.

Labanda semipars Walker.

Head nearly smooth with a little obscure granulation. Frons higher than wide and much shorter than coronal suture; frontal setae only slightly above level of pores. Ocellus 2 very close to 1, more distant from 3. Labral emargination about one-third deep, nearly right-angled. Mandible with three teeth and oblique cutting edge distally; with a strong subrectangular internal tooth. Spinneret elongate, rather wide basally, tapering in distal half to rounded apex. Body setae rather long, fine, mostly on small pimples; VII is bisetose on A 1, trisetose on A 2; IV below level of spiracle on A 2 to A 4; III on A 8 nearly vertically above spiracle, only slightly more cephalad. Crochets (fig. 18) strongly heteroideous, only the middle third or so of the mesoseries with normal crochets. Length about 17 mm.

Head yellow, ocellar region black; body white with black patches as follows: four on T 1; transverse dorsal on each following segment; around each spiracle with an extension towards the dorsal patch of each segment; a finer black intersegmental line dorsally on most segments.

Larvae on *Glochidion velutinum* (Euphorbiaceae); Dehra Dun.

Risoba Moore.

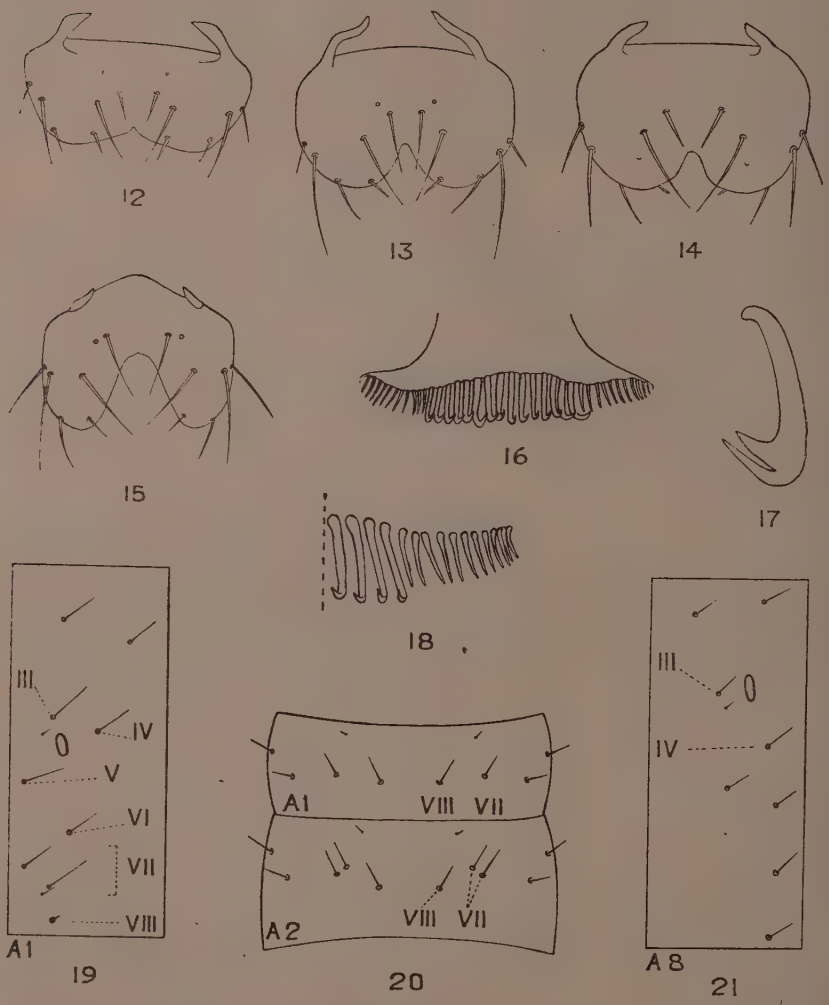
Head smooth. Frons small, less than half as long as coronal suture, at most slightly higher than wide; the frontal setae slightly above the level of the pores. Ocellus 2 much closer to 1 than to 3. Labral emargination nearly half deep, subacute. Mandible with distal margin nearly entire; inner face with transverse carina. Spinneret moderately slender, very slightly tapering to the blunt apex. Basal segment of labial palp elongate, apical seta shorter. Body setae short, not raised basally; group VII bisetose on A 1, trisetose on A 2; III on A 8 well anterior to spiracle and a little above its level. Pygidium finely granulate anteriorly.

Risoba obstructa Moore.

Gardner 1941 : 277.

The head is testaceous; the body tinged with brown, a white line below level of setae 2; setae on small white spots; legs, external faces of prolegs and spiracles black. A transverse dorsal hump on A 8 is very distinct. Length about 20 mm.

Larvae defoliate *Lagerstroemia flos-reginae* and *Quisqualis indica* in Dehra Dun; *Xylia dolabriformis* in Burma.



FIGS. 12–21.—12, *Chlumetia transversa*, labrum ; 13, *Anuga multiplicans*, labrum ; 14, *Eutelia sinuosa*, labrum ; 15, *Westermannia coelisigna*, labrum ; 16, *Paectes subapicalis*, crochets ; 17, *Oglasa separata*, a crochet ; 18, *Labanda semipars*, half of a mesoseries ; 19, *Polydesma umbricola*, setal map of A 1 ; 20, *Chlumetia transversa*, setal map of A 1, A 2 in ventral view ; 21, *Chlumetia transversa*, setal map of A 8.

Risoba prominens Moore.

Head testaceous with some dark reticulation; body purplish with darker mottling, with an irregular dorsolateral pale line on each side; setae on white spots; legs pale; prolegs with an external dark spot. Length about 25 mm. (Small larvae are green with a yellow line on each side.) There is no hump on A 8.

Larvae defoliate *Pterocarya stenoptera;* Dehra Dun.

Sarrothripus group.

The two frontal setae well above the level of the frontal pores and usually about half way up the frons. Ocellus 2 about half way between 1 and 3. Frons higher than wide. Spinneret rather narrow, nearly parallel sided, obtuse at apex. Setae long; III on A 8 well above level of spiracle and slightly more cephalad; IV with a tendency to drop below level of spiracle on segments posterior to A 1; setal group VII is bisetose on A 1, trisetose on A 2. Crochets homoideous. Skin smooth or very finely granulate. Small larvae up to about 20 mm. long.

The following key is based on rather scanty material.

1. Setal rings of body black on small pimples and set in small brownish plates. Head and pronotum (in part) dark brown; legs blackish, spiracles black. (Mandible without internal tooth. Body with pale brown mottling) . . . . . 2.
   Without dark pigmentation. Setae not on plates . . . . . 3.
2. Labral emargination slightly more than a right angle. (Setal plates less conspicuous.) Larvae on leaves of *Terminalia tomentosa, T. paniculata* . . . . . *Garella rotundipennis* Walker.
   Labral emargination more obtuse. Larvae on leaves of *Quercus incana* . . . . . *Characoma ruficirra* Hampson.
3. Mandible with distinct internal tooth . . . . . 4.
   Mandible without internal tooth . . . . . 5.
4. Frontal setae distinctly less than half way up the frons. Labral emargination nearly a right angle. Seta IV on A 8 well below level of spiracle. Pale green. On leaves of *Populus ciliata* and *Quercus incana;* Garhwal . . . . . *Sarrothripus revayana* Scopoli.
   Frontal setae half way up the frons. Labral emargination obtuse. Seta IV on A 8 level with lower extremity of spiracle. Yellowish green. On leaves of *Butea frondosa;* Dehra Dun *Giaura sceptica* Swinhoe.
5. Frons nearly as long as coronal suture. Head yellowish green; body pale green with white dots. On leaves of species of *Lagerstroemia* *Symitha nolalella* Walker.
   Frons distinctly shorter than coronal suture. Head greenish yellow; body pale green. On leaves of *Pterocarya stenoptera;* Dehra Dun *Sarrothripus sinuosa* Moore.[2]

HERMINIINAE.

Prolegs complete and equal. Crochets uniordinal, homoideous. Setae short to moderate, III on A 8 from nearly vertically above the spiracle to more anterior; setal group VII on A 1 and A 2 is trisetose (but bisetose on each in *Herminia*). Head closely granulate, with dark reticulate markings (somewhat obscured in *Hydrillodes*). Frons shorter than coronal suture, the two setae nearly level with, to well above, the pores. Ocellus 2 usually nearer to 1 than to 3. Spinneret elongate, rather narrow. Mandible without internal tooth. Body skin finely granulate, the granules conical with several ribs (giving the suggestion of an asteroid

[2] Moths determined by Mr. R. J. Collins. This species is listed by Hampson under *Sarrothripus*, but the larva suggests *Symitha* as does the moth.

appearance under the microscope). Spiracles with a small lip at each extremity. Body setae on small but distinct convex brown plates or brown pimples, but each borne laterally on a soft projection in *Herminia*. A very fine seta is borne laterally at spiracular level on each thoracic segment. Small larvae up to 25 mm.

This group is probably a natural one and includes species of *Bertula*, *Simplicia*, *Hydrillodes*, *Hipoepa*, *Progonia*, *Nodaria* and *Herminia*. The last feeds on moss; the other genera seem to prefer a diet of decaying leaves.

Herminia near *nyctipasta* Hampson.

This larva differs from the others in that the tubercle bearing setae I, II on segments T 2 to A 9 inclusive arise laterally on quite strong, soft projections (fig. 23); each projection with a narrow more or less elongate extension; setae III to V on similar but smaller projections. Another peculiarity is that setal group VII is bisetose on both A 1 and A 2.

Frons almost smooth, the two setae above level of pores. Labral emargination extremely shallow. Setae on head and body (except two frontal setae and four stout setae at posterior extremity which are acutely narrowed) moderately long, rather stout, weakly capitate. Granulation of body very close, uniform. Spiracles black with thick rims. Head sordid greenish with black more coarsely granulate reticulation; body dark olive green mottled with black and with paired dark segmental marks above. Length about 18 mm.

The larva, which has a strong resemblance to the moss on which it feeds, was first discovered by Mrs. M. D. Wright; Dehra Dun. (Moth determined by T. H. C. Taylor.)

Hydrillodes lentalis Guenée.

Frontal setae well above level of pores; frons not granulate. Labral emargination very weak. Setae short, mostly gradually expanded and truncate distally; not abruptly raised basally on A 8; lateral setae on small corneous pimples. III on A 8 above level of spiracle and distinctly more cephalad (fig. 24). Granulation of body consists of well separated coarser granules, the intervening space with similar but smaller granules. Head blackish, the reticulation obscured, a sordid pale patch on each side; body dull blackish brown; pronotum with four black patches. Length about 20 mm.

Larvae were taken on three occasions from large heaps of decaying grass; Dehra Dun.

Progonia reniferalis Hampson.

Seta II on A 8 each on an abrupt conical tubercle; III on A 8 above spiracle but more cephalad. Frons granulate, the setae nearly level with pores. Labral emargination nearly one third deep, nearly right angled. Granulation of body skin fine, uniform. Antennae, legs and prolegs blackish; general colour dark brown. Length about 18 mm.

Larvae on leaves of *Rubia cordifolia*. (Moth identified by T. H. C. Taylor.)

Hipoepa fractalis Guenée.

Frons distinctly granulate, the setae nearly level with the pores. Skin granulation close, uniform. Setae moderate, acuminate, not markedly raised basally. Body with dark brown mottling and segments behind T 1 each with a characteristic triangular black patch, which includes setae I and narrows to a point between setae II. Antennae and legs testaceous; prolegs with small brown mark at base. Length about 18 mm.

Larvae were found on dry leaves of *Dalbergia sissu* and in dry grass; in another case larvae were reared on dry leaves of *Rubia cordifolia*. (Moth identified by R. J. Collins.)

Simplicia robustalis Guenée.

Frons distinctly granulate, the setae nearly level with pores. Labral emargination obtuse, about one third deep. Skin granulation (fig. 22) rather widely spaced, the intervening area

irregular. Setae short, fine, pointed, slightly raised basally. Head with brown reticulation, body dark mottled without definite pattern. Length about 20 mm.

Larvae on dry tea (specimens from Government Entomologist, Ceylon); on dry grass and dry leaves; Dehra Dun.

Nodaria externalis Guenée.

Frons distinctly granulate, setae nearly level with pores. Labral emargination nearly one-third deep. Skin granulation irregular, some granules coarser, widely spaced. Setae not strongly raised, rather wide, pointed. Dark brownish mottled above, vaguely darker mediodorsally. Legs and prolegs pale with brown marks. Length about 20 mm.

Larvae found in heaps of dry grass and dry leaves of *Dalbergia sissu*; Dehra Dun.

Nodaria similis Moore.

Frons granulate. Seta III on A 8 above level of spiracle, but slightly more anterior. Labral emargination about one third deep, subacute. Granulation of skin close and regular. Head with distinct brown reticulation; body with fine irregular brown strigulation. Length about 20 mm.

Larvae were found on dry leaves of *Ipomaea sinuata* and *Derris scandens*; Dehra Dun. They feed on both dry and green leaves in the laboratory. A spiracle is shown in fig. 25.

Bertula dentilinea Hampson.

Head and frons entirely granulate, the frontal setae level with the pores. Labral emargination obtusely angulate, about a fourth deep. Body setae moderately long, rather fine, but mostly rounded apically; mostly on distinct brown pimples themselves borne on soft globose protuberances; III on A 8 well anterior to spiracle and slightly above its level. Skin granules more distinct on pigmented areas, sometimes longer than wide. Spiracles black. Length about 18 mm. Head green with black reticulation, frons with two black spots; body greenish black, most segments with a triangular black spot enclosing setae I and narrowing between II; with some white lateral to the last; laterally mottled green and black.

Larvae obtained by sweeping dry and green grass fed on both in the laboratory. A moth in this collection is recorded as having been reared from a larva which dropped from a thatched roof; Dehra Dun.

NOCTUINAE.

Anophia leucomelas L.

Frons slightly higher than wide and a little shorter than coronal suture; the setae a little above the level of the pores. Ocellus 2 very close to 1, more distant from 3. Labral emargination approximately right angled, about one third deep. Mandible obtusely dentate distally, with internal transverse plate. Spinneret and labial palps as in fig. 29. Body setae rather short and fine, VII trisetose on A 1 and A 2; III on A 8 is vertically above the spiracle. Body skin smooth, A 8 with dorsal hump. Spiracles elliptical, with black rims, of A 1 to A 7 much smaller than of A 8. Length about 40 mm. Head (including frons) ash grey with numerous black spots. Body closely covered with small black spots, the interstices grey; a larger pair of spots dorsally on A 1 and A 2; five ochreous lines along the body; one mediodorsal is interrupted on the hump on A 8, where there is a white spot. Legs pale with external black spot.

Larvae on leaves of *Ipomaea muricata* and *I. sinuata*; Dehra Dun.

Anticarsia irrorata Fabricius.

Head smooth. Frons distinctly higher than wide and about as long as coronal suture; the setae above the level of the pores. Ocellus 2 close to 1, more distant from 3. Labral emargination nearly a third deep, approximately right angled. Mandible distally with three

teeth and an oblique cutting edge ; with two unequal internal teeth. Spinneret moderately slender, not projecting much beyond labial palp ; slightly narrowed at the bilobed apex. Body setae moderately short ; group VII trisetose on A 1 and A 2 ; III on A 8 anterior to spiracle and a little above its level. Length about 43 mm.

Head green with some dark reticulation laterally ; body green with some vague fine pale lines ; fuscous below spiracular level ; setae I and II on black dots ; spiracles white with black rims.

Larvae on leaves of *Dolichos lablab* and *Phaseolus mungo* ; Dehra Dun.

Catephia inquieta Walker.

Closely allied to *Anophia leucomelas* L. but differs from that as follows : labral emargination distinctly more obtuse ; the mandible has no internal armature, and the spiracles of A 1 to A 7 not quite so small as compared with that of A 8. Length about 30 mm. Described from larvae lent by the Imperial Agricultural Research Institute, " on young cane leaves, Pusa, May, 1905." After more than forty years in spirit dark markings are still present ; the head (with frons) speckled with black ; the body with a series of larger dark spots along the line of the spiracles and with rather widely spaced spots mostly small but one or two paradorsally on each segment larger ; a mediodorsal pale spot on A 8 is distinct. Spiracles with dark rims.

Coarica fasciata Moore.

Head dull (except frons and adfrons), smooth. Frons slightly higher than wide, much shorter than coronal suture ; the setae well above the level of the pores, sublateral. Labral emargination acute and about half deep. Mandible with distal margin having two blunt teeth at the middle and an angulation at each extremity ; internal tooth large, obtuse. Spinneret subcylindrical, slightly tapering, extending well beyond the very long basal segment of labial palp. Body setae fine, rather long, on distinct but rather small basal tubercles ; VII trisetose on A 1 and A 2 ; V on A 1 more cephalad than spiracles ; III on A 8 well above spiracle but slightly more anterior. Prolegs of A 3 and A 4 smaller than the others. Skin dull, with close covering of extremely fine points and finer granules. Spiracles with black rims, rather small. Length about 40 mm.

Head (and labrum) blackish ; a white band across frons extends laterally to above antennae ; another lateral white band on each side ; body dull white with paradorsal black patches on each segment (but A 8 nearly entirely white above) and with small black marks ventrolaterally ; dorsal pimples yellow ; legs and prolegs pale.

Larvae on leaves of *Pterocarya stenoptera* (JUGLANDACEAE) ; Dehra Dun, U.P. The trees were raised from seed sent from U.S.A.

Fodina stola Guenée.

Gardner 1941 : 290.

Head surface irregular and with a few granules. Frons nearly equal in length to coronal suture and about as high as wide ; the frontal setae level with the pores. Ocellus 2 very close to 1 and more distant from 3. Labral emargination a wide curve about one-fifth deep. Mandible (fig. 10) distally with three large sharp teeth and two small teeth ; with a strong internal tooth. Spinneret elongate, tapering distally. Body setae moderately short, not elevated basally ; setal group VII trisetose on A 1 and A 2 ; III on A 8 well anterior to spiracle and rather above its level ; V on A 1 nearly vertically below the spiracle. Crochets heteroideous, four or five vetigial crochets at the extremities of each mesoseries. Skin dull, with an extremely fine granulation. Length about 35 mm.

Colour variable ; head yellow to reddish ; body nearly entirely black with a yellow line on each side or the black marks reduced to transverse black lines on a yellow ground. Spiracles black.

Larvae on leaves of *Holarrhena antidysenterica* (APOCYNACEAE) ; Dehra Dun.

Fodina pallula Guenée.

Head nearly smooth, feebly irregular. Frons very nearly as wide as high, almost as long as coronal suture ; setae and pores level. Ocellus 2 only slightly nearer 1 than 3. Labral emargination about one-fourth deep, abrupt and acutely curved. Mandible very much as

in *F. stola*. Spinneret slender, acutely narrowed apically. Body setae as in *F. stola*. Crochets homoideous. Skin dull. Length about 33 mm.

Pale green with paradorsal white lines and some white spots dorsally; a small black spot on each side of T 1; a mediodorsal black spot on T 2, T 3, A 1, A 2 and A 8. Spiracles pale with fine brown rims.

Larvae on leaves of *Vallaris heynei* (APOCYNACEAE); Dehra Dun.

Episparis tortuosalis Moore.

Gardner 1941 : 292.

Head distinctly granulate with black setiferous spots. Frons scarcely higher than wide and much shorter than coronal suture; frontal setae moderately high above pore level and sublateral. Ocellus 2 slightly closer to 1 than to 3. Labral emargination extremely acute and nearly three-fourths deep. Mandible with three obtuse distal teeth and with strong internal armature consisting of a transverse ridge and a small tooth. Spinneret moderately slender, slightly tapered, bilobed at apex, scarcely projecting beyond the very long basal segment of labial palp. Body setae long, bristle-like, I to VI on strong black corneous conical tubercles; VII is trisetose on A 1 and A 2; III on A 8 anterior to spiracle and slightly above its level; IIIa anterior to spiracle on an isolated brown plate. Skin smooth. Prolegs nearly equal. Length 40 mm.

Larvae on leaves of *Chickrassia tabularis*; Kalimpong, Bengal. This larvae is very unlike that of *E. liturata* F., and if my larvae are correctly identified the two species are probably not congeneric.

Episparis liturata Fabricius.

Head coarsely granulate in part. Frons higher than wide and moderately shorter than coronal suture; setae slightly above level of pores. Ocellus 2 slightly nearer 3 than 1. Labral emargination a very shallow curve. Mandible with three distal teeth and a rather short entire cutting edge; internal tooth not distinct. Spinneret moderately elongate, subparallel sided, bilobed at apex. Body setae rather short, on very slight basal pimples; VII is trisetose on A 1 and A 2; III on A 8 nearly directly anterior to upper extremity of spiracle. Length about 40 mm.

Pale green; head with some pink stripes; body with a paradorsal white line on each side and some pink marks and numerous white dots; setal rings partly encircled by red; spiracles pale.

Larvae feed on leaves of *Adina cordifolia* (RUBIACEAE); Dehra Dun.

Hypocala Guenée.

Head smooth. Frons slightly higher than wide and much shorter than coronal suture; the setae above the level of the pores. Ocellus 2 distinctly separated from 1, but nearer to that than to 3. Labral emargination about a third deep, approximately right angled, curved. Mandible with three strong distal teeth and a single strong internal tooth. Spinneret elongate, obtuse at apex. Body setae short; group VII trisetose on A 1 and A 2; III on A 8 nearly directly anterior to upper extremity of spiracle.

H. rostrata Fabricius.

Gardner 1941 : 289.

There is a good deal of colour variation in larvae reared at Dehra Dun from leaves of *Diospyros melanoxylon* (EBENACEAE), the head varying from reddish to dark brown; the body with much black pigmentation and with variable pale spots and lines. The species has been reared from *Quercus incana* in Garhwal (Balwant Singh). Both *H. rostrata* and *H. biarcuata* Walker have been reared together from *Diospyros montana* and from *D. tomentosa* in Coorg, but I am unable to state on the available larvae whether there is any constant differentiating character.

H. moorei Butler.

Moore, 1887, *Lepid. Ceylon* **3** : 126, pl. 160, fig. 5a.

I have one larva associated with reared moths from an unidentified plant in Dehra Dun. This larva has lost its colour through preservation in alcohol, but a very distinct black longi-

tudinal line on each side of the head distinguishes it from *rostrata*; near each spiracle and partially enclosing it are some irregular black marks; legs black in part. Moore (referring to the species as *efflorescens* Guenée) says the larva is pale greenish grey above, green beneath; there are three white lines on each side.

The larvae feeds on *Diospyros* sp.

Mecodina cineratia Butler.

Head slightly irregular. Frons not higher than wide and much shorter than coronal suture; setae and pores level. Ocellus 2 much closer to 1 than to 3. Labral emargination almost semicircular, about one fourth deep. Mandible distally with three teeth and an oblique cutting edge and internally with a distinct tooth. Spinneret rather slender, slightly tapering to blunt apex. Basal segment of labial palp long. Body setae moderately short; group VII trisetose on A 1 and A 2; III on A 8 almost directly anterior to upper extremity of spiracle. Length about 30 mm. Head yellowish; body pale green with whitish lines; spiracles brown.

Larvae on leaves of *Ficus roxburghii*,; Dehra Dun.

Pandesma quenavadi Guenée.

Gardner 1941 : 291.

Head rather coarsely rugulose-granulate (the frons smoother). Frons higher than wide and nearly equal in length to coronal suture; frontal setae nearly level with pores. Ocelli large, 1 to 4 rather close and nearly evenly spaced. Labral emargination a wide and very shallow curve. Mandible with five distal teeth, two near the middle larger; internal armature (fig. 1) complex, a transverse ridge nearly entire posteriorly, but with numerous teeth anteriorly; there is also a small acute isolated tooth. Spinneret elongate narrow, slightly tapering to the rounded apex. Body setae short, not raised; setal group VII is trisetose on A 1 and A 2; V on A 1 ventrocephalad of the spiracle; III on A 8 anterior to spiracle and nearly level with its upper margin. Skin smooth, dull. Length about 35 mm.

Head with much black which tends to be continuous anteriorly, but is more reticulate posteriorly. Body with much blackish speckling which tends to form lines along each side. Spiracles black.

Larvae feed on bark of *Acacia catechu* and *Albizzia lebbek;* Dehra Dun and Bareilly U.P. The larvae shelter under dead leaves or stones one to two inches deep in the soil; leaves are refused (observations by Balwant Singh). Records of this species as a defoliator may be incorrect.

Polydesma umbricola Boisduval.

Head nearly smooth, with some feeble striae. Frons distinctly higher than wide and shorter than coronal suture; setae and pores level. Ocellus 2 much closer to 1 than to 3. Labral emargination a wide shallow curve. Mandible (fig. 2) very much as in *Pandesma quenavadi*, but the internal armature with fewer denticles. Spinneret moderately long, slender, narrowed distally. Body setae short, not raised basally; group VII trisetose on A 1 and A 2; V on A 1 below and well anterior to spiracle; III on A 8 anterior to spiracle and slightly above its level. Skin dull. Length about 35 mm. A setal map of A 1 is shown in fig. 19.

Head testaceous with blackish reticulation which is confluent anteriorly. Body pale with much black and brown speckling which has a tendency to form vague lines; legs and prolegs pale; spiracles black.

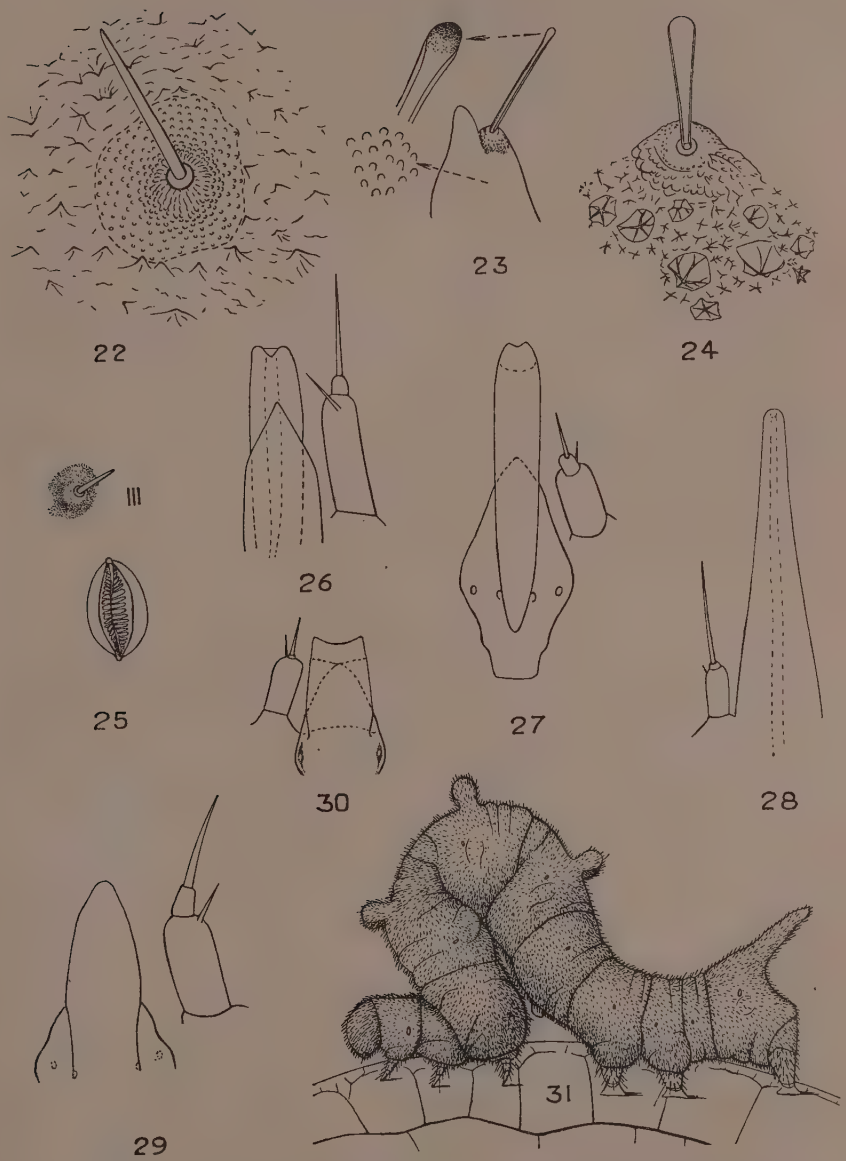
Larvae feed on bark of *Albizzia lebbek;* Dehra Dun and Bareilly.

Catocalinae.

Attatha regalis Moore.

Gardner 1941 : 283.

Head distinctly granulate. Frons nearly as wide as high and about equal in length to coronal suture; setae and pores level. Ocellus 2 much closer to 1 than to 3. Labral emargination a wide curve about one-fourth deep. Mandible with three strong distal teeth (and



FIGS. 22–31.—22, *Simplicia robustalis*, seta II of A 8 and skin ; 23, *Herminia* near *nyctipasta*, seta II of A 1 with its tubercle ; 24, *Hydrillodes lentalis*, seta II of A 8 and skin ; 25, *Nodaria similis*, spiracle of A 8 ; 26, *Eutelia blandiatrix*, spinneret and a labial palp ; 27, *Sesamia inferens*, the same ; 28, *Cocytodes coerula*, the same ; 29, *Anophia leucomelas*, the same ; 30, *Seudyra albifasciata*, the same ; 31, *Oruza vacillans*, larva.

one or two small angulations) and with strong internal tooth. Spinneret elongate, slightly narrower near the truncate apex. Basal segment of labial palp about twice as long as wide. Body setae short; group VII trisetose on A 1 and A 2; III on A 8 directly anterior to upper extremity of spiracle. Spiracles rather large, pale, with fine brown rims. Length about 45 mm.

Head green; body green, segments T 2 to A 9 each with a small black paradorsal spot on each side; three yellow lines along each side of the body.

Larvae on leaves of *Ficus religiosa* and *F. cunia*; Dehra Dun.

Cocytodes coerulea Guenée.

Head wider than high, weakly granulate. Frons higher than wide, the two setae not far above the pores. Epistoma emarginate. Labral emargination about one-fourth deep, subacute, rounded at base. Ocellus 2 about equidistant from 1 and 3. Mandibles (fig. 9) with four distal teeth and a strong internal tooth. Spinneret (fig. 28) long and slender. Body setae on slightly raised but quite distinct basal pimples; setae mostly long. Seta III on A 8 vertically above anterior margin of spiracle. Group VII with three setae on A 1 and A 2. Spiracles large, that of A 7 about two-thirds that of A 8. Length about 80 mm. (In early instars the prolegs of A 3, A 4 are reduced instead of being nearly equal as they are in the mature larva.)

The colour is variable; the head, pronotum, legs and prolegs may be red or black; body either pale yellow above, each typical segment with six transverse black lines, or the yellow reduced to six pairs of transverse spots on a black ground; laterally black with very irregular broken pale lines, one above spiracles, one, wider below that; spiracles ochreous with black rims, set in a crimson patch; ventral surface pale yellow; setae white. Pupae in thin cocoon of silk and soil.

Larvae feed on *Girardinia heterophylla* and *Debregeasia hypoleuca* (both Urticaceae); Garhwal and Dehra Dun.

Plecopterodes pulchra L.

Head with some very fine close flattened granulation. Frons about as high as wide and slightly longer than coronal suture; setae and pores nearly level. Ocellus 2 only very slightly nearer 1 than 3. Labral emargination shallow, widely curved. Mandible (fig. 11) elongate, distally with three large and three very small teeth; without internal teeth. Spinneret very slender, elongate, projecting far beyond labial palps, tapering from base to apex. Body setae short; group VII trisetose on A 1 and A 2; III on A 8 nearly directly anterior to upper extremity of spiracle; V on A 1 nearly vertically below spiracle. Spiracles rather larger testaceous. Length about 25 mm.

Specimens in alcohol are colourless and it is probable that living larvae are green.

Larvae from leaves of *Ficus infectoria*; Bareilly, U.P. (*Balwant Singh*).

Addenda.

Group A I.

Gardner 1946*a* : 62.

Varmina indica Walker (Lymantriidae).

Since this larva lacks the characteristic mediodorsal glands on A 6 and A7 of the Lymantriidae and, so far as I can see, resembles the hairy Acronictinae larvae, I have tentatively included the species here.

The larva resembles *Diphthera champa* Moore in having numerous secondaries on the head, but is easily distinguished from that by lacking large rounded paradorsal protuberances on the mesothorax. T 2 and T 3 with two verrucae on each side above the lateral verruca (which is at spiracular level). All verrucae distinct, with numerous setae, some very long (especially on verrucae II of A 1 and A 8), some shorter and finer; secondaries present on head and prolegs. Length about 25 mm. Head black (reddish in adfrontal zone); body mostly blackish; setae blackish to pale.

Larvae on *Aesculus indicus*; Kulu, Punjab; I also collected a few larvae from *Abies pindrow* at the same time.

The pupa resembles those of the LYMANTRIIDAE I have seen in having neither the labial palp nor femora of prothoracic legs exposed (both are exposed in ACRONICTINAE); it differs from LYMANTRIIDAE and resembles ACRONICTINAE in that the body setae are not long and conspicuous.

Group A II.

Gardner 1946*b* : 238.

Polytela orientalis Hampson.

Fletcher 1919, *Bull. agric. Res. Inst. Pusa.* **89** : 62, figs.

The characters of the larva, including the wide separation of ocelli 1 and 2, very much as in *P. gloriosae* F. (*loc. cit.* : 243), except that VII is unisetose on A 1, bisetose on A 2 (bisetose and trisetose in *gloriosae*).

Head red with no black marks; pronotal plate red but black anteriorly (except medially); pygidium black anteriorly, red posteriorly; T 2 and T 3 white with an irregular black streak on each side; A 1 to A 8 white with irregular black bands (a dorsal pale spot usually distinct) reaching across dorsum to below the spiracles on each side.

Larvae provided by the Imperial Agricultural Research Institute had been reared on *Ischaenium pilosum*; Delhi.

Hadjina chinensis Walker.

Ventral prolegs only slightly reduced from A 6 to A 3, crochets uniordinal. Setae short, not raised, not on plates; III is vertically above the anterior margin of the spiracle; VII is trisetose both on A 1 and A 2. Frons higher than wide, not shorter than coronal suture, frontal setae above pore level. Ocellus 2 nearer 1 than 3. Labral emargination a wide curve. Mandible sharply dentate: an acute ventral, three large acute, one rather smaller, and then along the dorsal margin, about ten sharply defined small teeth; there is no internal tooth. The spinneret very short, transversely subrectangular. Labial palp with the distal seta much shorter than basal segment, which is not quite twice as long as wide. Body skin smooth. Length about 25 mm. Entirely pale green except a few fine white lines above.

On *Artemisia vulgaris*; Dehra Dun.

This larva is unusual for an Amphipyrine in having VII trisetose on A 1; however, all the other characters are those of larval Group A II; the short truncate spinneret has not been found outside Division A.

Plagiograpta macrodonta Hampson.

Head rather strongly transverse. Frons rather narrow, higher than wide and subequal to coronal suture; setae slightly above pore level. Ocelli 1 and 2 contiguous. Labral emargination shallow, very obtuse. Mandible (fig. 8) with five sharp distal teeth; internal armature consisting of two biapiculate teeth and two smaller (concealed) teeth. Spinneret elongate, projecting beyond distal seta of labial palp, slightly tapering, the apex rounded with a short median extension. Body setae short, extremely so on dorsal surface; VII is bisetose on A 1, trisetose on A 2 where the innermost seta is capitate (as is also seta VIII); III on A 8 is vertically above the spiracle; seta IV is well below spiracular level on all abdominal segments. Body skin finely and closely granulate. The body has no tubercles and is very slightly thicker at the thorax. Spiracles black, length about 17 mm. Two larvae in alcohol are almost colourless, the head and pronotum with some dark speckling.

Moths were reared from an unidentified plant. Kannoth, Madras. The species is in the ACONTIINAE according to Hampson.

Group A VI.

Gardner 1946*b* : 249.

Seudyra albifascia Walker.

This Agaristine larva has much in common with *Aegocera* and *Eusemia*, both AGARISTINAE (*loc. cit*).

Setae II on A 8 each on a moderately strong rounded tubercle, setae I on that segment (which is humped above) on much smaller tubercles; setae I and II not raised basally on other segments. The spinneret (fig. 30) almost rectangular, truncate apically and a little longer than wide.

The body setae are moderately long, relatively shorter than in the other two genera; the mandible has a distinct internal tooth; the labral emargination a small abrupt subacute notch (smaller than in *Eusemia*, much more abrupt than in *Aegocera*). Length about 50 mm.

Head, pronotum, the tumid part of A 8, the pygidium and prolegs all red with black setiferous spots; legs red with black marks, the claw-bearing segment black. Body black laterally (with some enclosed yellow marks), dorsally whitish with broad black transverse bands across the middle of each segment and with some finer black lines ventrally yellow. Spiracles black.

Larvae on leaves of *Dillenia indica*, Dehra Dun.

Donda ornata Moore.

Head shining, with scattered granules. Frons small, higher than wide, less than half as long as coronal suture; the two frontal setae lateral and about half-way up the frons. Ocellus 2 almost midway between 1 and 3. Labral emargination obtuse, about one-third deep. Mandible with three obscure angulations distally; internal face with a bi-apiculate transverse ridge. Spinneret moderately slender, truncate. Labial palp with elongate basal segment. Body setae mostly long, of upper surface borne apically on very strong (I, II) or rather weaker (III, IV) conical projections; V and VI on rounded projections; seta I only slightly anterior to II on A 1 to A 7; setae I and II forming a strongly transverse rectangle on A 8; IV higher than usual on A 1 to A 6 close to III which is above the spiracle; VII bisetose on A 1, trisetose on A 2. Skin microscopically spinulose. Length about 40 mm.

Head crimson, black ventrolaterally. Body sordid white above with transverse yellow stripes; black spots as follows: two on each side of T 1 and a spot near base of seta III on following segments and two on pygidium. Spiracles whitish with very fine brown rims.

Larvae feed on leaves of *Bombax malabaricum* and of *Ochroma lagapos* (an introduced species), both BOMBACEAE, in Dehra Dun (August, September). Pupae in soil. Since the adults appear to belong to the NOCTUINAE the larva is rather out of place here although its characters bring it to Group A VI.

Group A VII (new group).

CUCULLIINAE.

I have only one inflated larva of *Cucullia verbasci* L. kindly provided by Dr. H. E. Hinton.

The ventral prolegs are all present and equal, VII is bisetose on A 1 and trisetose on A 2; III on A 8 is vertically above the spiracle (characters of Division A). There are no secondary setae or verrucae; the adfrontal sutures meet well before the vertical sinus of the head, and the crochets are biordinal; the larva therefore comes near my group A IV (HELIOTHINAE), but differs from that in having the body skin smooth (not covered with pointed granules). Frons higher than wide, shorter than coronal suture; frontal setae well above level of pores. Ocellus 2 almost equidistant from 1 and 3. Spinneret long and slender. Body setae moderately long, not on basal plates or pimples. Spiracles large, broadly oval. (Head and body pale with much black marking). Length about 35 mm.

This species has been reared from *Verbascum thapsus* in the Punjab.

Group B I.

Gardner 1946*a* : 65 ; 1947 : 60.

Oglasa separata Walker.

Prolegs absent from A 3 and A 4. Crochets homoideous ; appendiculate, the postapical tooth very acute, nearly as long as and nearly as slender as apical tooth (fig. 17). Labral emargination about one-third deep. Seta III on A 8 rather close to spiracle, above its level but distinctly more cephalad ; setae moderately long, those on the dorsal surface on pimples which are very marked on posterior segments. Head coarsely granulate (except anterior median zone). Spinneret long and slender. Length about 49 mm. Head yellow with five large black spots (one paradorsal and one ocellar on each side and one on frons) ; body tinged with yellow, a paradorsal and a spiracular white line along each side ; legs black ; prolegs and spiracles pale.

Larvae defoliate *Sterculia urens* ; Dehra Dun. (Moth determined by T. H. C. Taylor.)

Bocula near *megastigmata* Hampson.

Prolegs on A 3 and A 4 very small, nearly equal. Crochets homoideous, appendiculate, the postapical tooth moderately acute. Labral emargination obtuse, about a third deep. Body setae long, mostly on distinct pimples ; III on A 8 well anterior to spiracle and nearly level with its upper extremity. Head distinctly granulate except anteriorly. Spinneret long and slender. Length about 39 mm. Pale green ; head with two small yellow spots on each side above ; body with yellow dorsolateral line on each side (which may be pink where it touches setae II) ; legs, prolegs and spiracles pale.

Larvae defoliate *Sterculia villosa* ; Dehra Dun.

Group B IV b.

Gardner 1947 : 70.

Oruza vacillans Walker (Erastriinae).

Prolegs are absent from A 3 but present although minute on A 4 and with eight very small crochets ; the larva therefore falls into Group B IV *b*.

Head and body closely covered with fine distinct secondary setae. Frons higher than wide, a little shorter than coronal suture. Ocelli well spaced but 2 nearer 1 than 3. Labral emargination shallow. Mandible dentate apically, without internal tooth. Spinneret three times as long as wide, parallel sided, rounded at apex. Body form (fig. 31) unusual ; A 1, A 2, A 3 each with a dorsal pair of prominent rounded protuberances ; A 8 with a strong mediodorsal soft horn. Spiracles black, very small. Length about 17 mm. Colour dull mottled greyish black with a dorsal triangular quite black mark on A 2 and A 3.

Larvae were found on a creeper, *Naravelia zeylanica*, by beating. Larvae in captivity feed on fungus on dead leaves, but I have not yet reared the adult. At the same time two pupae were obtained, and from these moths of *Oruza vacillans* emerged ; the larvae are therefore identified on circumstantial evidence. A small figure of the larva by Moore (1887, *Lepid. Ceyl.* **3**, plate 174, fig. 1*a*) shows the posterior "horn" but not the paired protuberances on the anterior abdominal segments.

The Four Divisions of Larvae.

The arrangement in Divisions is to some extent artificial, and is intended to facilitate identification rather than to indicate phylogenetic relationship ; for example some genera in Division C are closely related to genera in Division B, the distinction being the arbitrary one of whether the anterior ventral prolegs are reduced or not. There is little doubt that the number of

setae in group VII on segment A 1 (i.e. whether two or three) should be the basis of a natural classification.

Division A.

Mature larvae.—Setal group VI is bisetose on T 1, unisetose on T 2 and T 3. Ventral prolegs complete and equal or nearly so. Seta III is vertically above the spiracle (or very nearly so) on A 8. Setal group VII is bisetose on segment A 1, trisetose on A 2 (with rare exceptions). Verrucae or secondaries present in Group A I (ACRONICTINAE). Crochets homoideous, usually uniordinal but biordinal in Group A IV (HELIOTHINAE) and in *Cucullia*. Spinneret from slender to transverse and wide at apex.

Remarks.—In *Callyna* the two anterior pairs of prolegs are rather more reduced than usual. In *Perigea* and *Hadjina* VII is trisetose on the first abdominal segment, but these genera are included here on account of their short truncate spinnerets.

References.—A key to the six groups of this Division is given in Part II, page 237. An additional group may be necessary for *Cucullia* (Part IV, page 314).

Notes on the following newly acquired species will be found under Addenda (Part IV, page 308); *Varmina indica* Walker, a Lymantriid, but apparently resembling the ACRONICTINAE (Group A I) in the larval stage; *Polytela orientalis* Hampson, *Hadjina chinensis* Walker and *Plagiograpta macrodonta* Hampson, all in Group A II; *Seudyra albifascia* Walker and *Donda ornata* Moore in Group A VI.

Division B.

Mature larvae.—Setal group VI is bisetose on T 1, unisetose on T 2 and T 3. The anterior pair of ventral prolegs (and often the second pair) abruptly reduced. Setal group VII usually trisetose on A 1 (but rarely bisetose as in *Rhesala* and some species of *Plusia*). Verrucae absent; secondary setae rarely present. Crochets homoideous, sometimes biordinal. Spinneret always elongate.

Remarks.—In *Abrostola* (Group B III) the anterior prolegs are hardly abruptly reduced but otherwise the larva is closely related to *Plusia*, both genera having biordinal crochets. In *Ischyja* (B IV C) the anterior prolegs are only moderately reduced and the larva (which is remarkable on account of the numerous secondaries on the prolegs) might perhaps have been included in Division C.

References.—Larvae of this Division are discussed in Part III, page 59; Groups B I and B II in Part I, pages 65, 69.

Addenda (Part IV, page 311) are: *Oglasa separata* Walker; *Bocula* near *megastigmata* Hampson (both in B I) and *Oruza vacillans* Walker in B IV b.

Division C.

Mature larvae.—VI is bisetose on II, unisetose on T 2 and T 3. Ventral prolegs complete and equal or nearly so. VII on A 1 may be bisetose or trisetose (rarely unisetose). Verrucae absent. III on A 8 usually cephalad of the spiracle, but if vertically above, VII is usually trisetose on segment A 1. Crochets homoideous or heteroideous. Spinneret never short and truncate.

Remarks.—In a few genera the prolegs of A 3 are rather smaller than usual in relation to the others and might perhaps be run to Group B IV C; such are: *Anophia* and *Iambia* with III on A 8 vertically above the spiracle;

Coarica with deep labral emargination; *Pandesma* and *Polydesma* each with complex internal armature on the mandible. *Labanda* with III almost vertically above the spiracle on A 8 and VII bisetose on A 1 is distinguished from Division A by its strongly heteroideous crochets.

References.—Division C is discussed in Part IV, page 291.

Division D.

Mature larvae.—Setal group VII is bisetose on all three thoracic segments (a small verruca in one species). Ventral prolegs complete and equal. Crochets homoideous or heteroideous.

Remarks.—The bisetose VII on segments T 2 and T 3 will distinguish this Division from any other.

Reference.—Part III, page 85.

Notes on Subfamilies.

The arrangement of genera in subfamilies in the following notes is based chiefly on Hampson's PHALAENAE.

Since the number of setae in VII on the first abdominal segment is of major importance (although there are some anomalies) the following summary is provided:

VII is bisetose on A 1, *trisetose on A* 2 (*rarely* 1, 2):

AMPHIPYRINAE (except *Perigea, Hadjina, Iambia*); HADENINAE; AGROTINAE; HELIOTHINAE; CUCULLIINAE; AGARISTINAE; EUTELIINAE (except *Anigraea*); SARROTHRIPINAE; STICTOPTERINAE (*Lophoptera*); PLUSIINAE (part); "ACONTIINAE" (most, but *Acontia* is an exception).

VII is trisetose on A 1 *and on A* 2*:*

PLUSIINAE (*Plusia* part); STICTOPTERINAE (*Odontodes*); EUTELIINAE (*Anigraca*); ERASTRIINAE; HYPENINAE; HERMINIINAE; CATACOLINAE; NOCTUINAE (except *Donda, Rhesala*); ACONTIINAE (*Acontia*).

ACRONICTINAE.

Genera examined: *Acronicta* Treitschke, *Diphthera* Treitschke, *Simyra* Ochsenheimer, *Thiacidas* Walker.

Larvae of this subfamily constitute Group A 1 (Part I, page 62). They have a considerable resemblance to LYMANTRIIDAE, but lack the mediodorsal glands on A 6, A 7 of that family. In the larva of *Varmina indica* Walker (LYMANTRIIDAE) these glands are missing, and since it would appear to run to ACRONICITINAE, I have given a brief description of it (Part IV, page 308). I have provisionally included the larva of *Cetola dentata* Walker in A I only because it has secondary setae on the prolegs.

AMPHIPYRINAE.

Genera examined: *Androlymnia* Hampson, *Cetola* Walker, *Chasmina* Walker, *Callyna* Guenée, *Calogramma* Guenée, *Dadica* Moore, *Dipterygia* Stephens, *Elydna* (*reclusa* Walker), *Eriopus* Treitschke, *Hadjina* Staudinger, *Iambia* Walker, *Laphygma* Guenée, *Perigea* Guenée, *Prodenia* Guenée, *Pyrrhia*

Hübner, *Sasunaga* Moore, *Sesamia* Guenée, *Spodoptera* Guenée, *Stenopterygia* Hampson, *Trachea* Hübner. This subfamily appears to have been created by Warren for those genera of ACRONICTINAE in which the larvae have no secondaries or verrucae. The majority of the genera named above fall into Group A II (Part II, page 238). *Cetola*, with secondaries on prolegs is provisionally in A I. *Pyrrhia*, with biordinal crochets, is grouped under A IV (HELIOTHINAE). *Callyna* is in A VI. In AMPHIPYRINAE setal group VII is usually bisetose on A 1, but in *Perigea*, *Hadjina* and *Iambia* it is trisetose; the first two genera are kept in Division A because of the wide truncate spinneret (which I have not found outside Division A); *Iambia* is in Division C. *Androlymnia*, *Chasmina* and *Elydna transversa* Walker are very different, and are closely related to *Acontia* Ochsenheimer (Group B I; Part I, page 65).

HADENINAE.

Genera examined: *Borolia* Moore, *Brithys* Hübner, *Cirphis* Walker, *Odontestra* Hampson, *Polia* Ochsenheimer, *Polytela* Guenée, *Sideridis* Hübner, *Tiracola* Moore.

Larvae of the above genera, with two exceptions, are in Group A II with the AMPHIPYRINAE. *Tiracola* is in A VI only because dorsal tubercles are present on segment A 1 (there are no such tubercles in Group A II). *Brithys* with setal group VI bisetose on all thoracic segments is abnormal, and is in Division D (Part III, page 85).

AGROTINAE.

Genera examined: *Agrotis* Ochsenheimer, *Euxoa* Hübner.

Three of the four species examined constitute Group A III (Part II, page 247) in which the adfrontal sutures extend to the posterior margin of the head and the body skin is granulate. In *Agrotis c-nigrum* L., however, the adfrontal sutures meet well before the posterior sinus and the skin is smooth; the larva is therefore treated under A II (Part II, page 242).

AGARISTINAE.

Genera examined: *Aegocera* Latreille, *Eusemia* Dalman, *Seudyra* Stretch.

Larvae form part of Group A VI (Part II, page 249); a description of *Seudyra albifascia* Walker is added in Part IV, page 310.

CUCULLIINAE.

I have seen only an inflated larva of *Cucullia verbasci* L. (Part IV, page 310). This resembles larvae of the HELIOTHINAE (Group A IV) in having biordinal crochets but differs in having the body skin smooth. If other species prove to be similar a new group of larvae (A VII) is necessary. However, Dethier (1944, *Canad. Ent.* **76**: 161) states that the crochets in *C. asteroides* Guenée are uniordinal.

HELIOTHINAE.

Genera examined: *Adisura* Moore, *Heliothis* Ochsenheimer, *Pyrrhia* Hübner.

The larvae examined constitute Group A IV (Part I, page 65; Part II,

page 247), which seems quite sharply defined. Hampson (PHALAENAE) has *Adisura* and *Heliothis* in the AGROTINAE and *Pyrrhia* in the ACRONICTINAE (*s. lat.*).

EUTELIINAE.

Genera examined : *Anigraea* Walker, *Anuga* Guenée, *Bombotelia* Hampson, *Chlumetia* Walker, *Eutelia* Hübner, *Paectes* Hübner, *Phlegetonia* Guenée.

All species examined are placed in Division C (Part IV, page 294), but owing to a wide range in generic characters, I have not succeeded in defining the subfamily as larvae. On the other hand the structure of the pupae is constant in what appear to be important characters. One or two larvae have III on A 8 almost vertically above the spiracle, and would nearly fit into Division A.

STICTOPTERINAE.

Genera examined : *Lophoptera* Guenée, *Odontodes* Guenée.

Larvae of both genera are in Division C (Part IV, page 298). Although there are rather striking differences between the two genera (in the crochets and in the number of setae in VII on A 1), the pupae are similar and distinct from any other Noctuid pupae examined.

PLUSIINAE.

Genera examined : *Abrostola* Ochsenheimer, *Plusia* Ochsenheimer.

Species examined are in Group B III (Part III, page 60). In *Plusia* the prolegs of A 3 and A 4 are not developed, but in *Abrostola* these prolegs are nearly as long as (but more slender than) the others. The subfamily otherwise seems well defined (especially by biordinal crochets). In *Abrostola* VII is bisetose on A 1 ; in *Plusia* VII may be bisetose or trisetose.

ACONTIINAE.

Genera examined : *Acontia* Ochsenheimer, *Aiteta* Walker, *Carea* Walker, *Churia* Moore, *Earias* Hübner, *Maurilia* Moeschler, *Plagiograpta* Hampson, *Pseudelydna* Hampson, *Westermannia* Hübner.

Hampson (1894, *Fauna Brit. India*) disperses the above genera in four different subfamilies, but later (1912, PHALAENAE : 455) includes them all in ACONTIINAE. Larval characters suggest that the former arrangement was the more satisfactory. *Acontia* is very different from the other genera, and comes into Group B I (Part I, page 65) ; *Aiteta*, *Carea*, *Maurilia*, *Pseudelydna* have much in common, and form Group A V (Part II, page 249) ; *Churia* is in Group A VI (Part II, page 249) ; *Earias* is in Division D (Part III, page 85) ; *Westermannia* is in Division C (Part IV, page 298), and *Plagiograpta* (*macrodonta* Hampson) is described in Part IV, page 309, coming into Group A II.

SARROTHRIPINAE.

Genera examined : *Barasa* Walker, *Blenina* Walker, *Characoma* Walker, *Eligma* Hübner, *Garella* Walker, *Giaura* Walker, *Labanda* Walker, *Risoba* Moore, *Sarrothripus* Curtis, *Selepa* Moore, *Symitha* Walker.

The above genera are listed by Hampson (PHALAENAE) in this subfamily. *Barasa alopha* Hampson is a Nolid (Gardner 1943, *Indian J. Ent.* **1** : 102). *Eligma* and *Selepa*, the larvae of which have the non-Noctuid character of VI being bisetose on all thoracic segments, are discussed in Division D (Part III, page 85).

The remainder are in Division C (Part IV, page 299); of these five genera (*Characoma*, *Garella*, *Giaura*, *Sarrothripus*, *Symitha*) have much in common and are referred to as the *Sarrothripus* group; the other three genera (*Blenina*, *Labanda*, *Risoba*) differ in various ways. All eight genera have VII bisetose on A 1, trisetose on A 2.

ERASTRIINAE.

Genera examined: *Amyna* Guenée, *Autoba* Walker, *Hiccoda* Moore, *Hoplotarache* Hampson, *Lithacodia* Hübner, *Oruza* Walker, *Ozarba* Walker, *Porphyrinia* Hübner, *Swinhoea* Hampson, *Tarache* Hübner, *Xanthograpta* Hampson.

With the exception of *Amyna*, the larva of which seems related to *Acontia* Ochsenheimer and others of Group B I (Part I, page 65), the larvae have much in common, although I have not been able exactly to define subfamily characters; these are treated in Group B IV (Part III, page 62). Prolegs are usually absent from A 3 and A 4, sometimes minute on both segments or absent from A 3 and small on A 4. The spiracles are usually extremely small on A 1 to A 7, that of A 8 twice as large or more. Crochets uniordinal but biordinal in *Ozarba*. The larva of *Oruza vacillans* Walker is described in Part IV, page 311.

HYPENINAE.

Genera examined: *Bomolocha* Hübner, *Dichromia* Guenée, *Harita* Moore, *Hypena* Schrank, *Rhynchina* Guenée, *Rhynchodontodes* Warren.

I am not certain of the limits of this subfamily on characters of the adult. With two exceptions, the species seen come into Group B II (Part I, page 69), which is fairly sharply defined. *Hypena aurotincta* Hampson, however, does not fit, and is in Group B IV a (Part III, page 62). *Rhynchodontes angulata* Hampson is in Group B IV *c* (Part III, page 76), and in this case the separation is supported by the structure of the pupa. The species referred to as *Hypena uniformis* Hampson (Part I, page 71) has since been determined as *Harita nebulosa* Moore by R. J. Collins.

HERMINIINAE.

Genera examined: *Bertula* Walker, *Herminia* Latreille, *Hipoepa* Walker, *Hydrillodes* Guenée, *Nodaria* Guenée, *Progonia* Hampson, *Simplicia* Guenée.

Larvae of the above genera are discussed in Division C (Part IV, page 301).

CATACOLINAE.

Genera examined: *Achaea* Hübner, *Anua* Walker, *Attatha* Moore, *Cocytodes* Guenée, *Enmonodia* Walker, *Grammodes* Guenée, *Mocis* Hübner, *Nyctipao* Hübner, *Ophiusa* Ochsenheimer, *Parallelia* Hübner, *Pericyma* Herr.-Schaff., *Plecopterodes* Hampson, *Speiredonia* Hübner.

The anterior pair of ventral prolegs is absent or abruptly reduced (Group B IV ; Part III, page 62), except in *Attatha*, *Cocytodes* and *Plecopterodes*, where the ventral prolegs are more or less equal (Division C, Part IV, page 307). Setae usually short (but long in *Cocytodes*) ; VII trisetose on A 1 and A 2 ; III usually cephalad of spiracle on A 8 (but vertically above in *Cocytodes*) ; II on A 8 sometimes on separate tubercles. Spinneret elongate. Spiracles of A 1 to A 7 more than half as large as those of A 8.

Noctuinae (? Ophiderinae).

Genera examined : *Anomis* Hübner, *Anophia* Guenée, *Anticarsia* Hübner, *Attonda* Swinhoe, *Bamra* Moore, *Beana* Walker, *Bocula* Guenée, *Calesia* Guenée, *Calpe* Treitschke, *Catephia* Hübner, *Coarica* Moore, *Cosmophila* Boisduval, *Donda* Moore, *Episparis* Walker, *Ericeia* Walker, *Erygia* Guenée, *Fodina* Guenée, *Hamodes* Guenée, *Haritolopha* Hampson, *Hypocala* Guenée, *Ischyja* Hübner, *Lacera* Guenée, *Lithosiopsis* Hampson, *Lyncestis* Walker, *Marcillada* Walker, *Mecistoptera* Hampson, *Mecodina* Guenée, *Oglasa* Walker, *Othreis* Hübner, *Pandesma* Guenée, *Pasipeda* Walker, *Polydesma* Boisduval, *Plecoptera* Guenée, *Plusiodonta* Guenée, *Rhesala* Walker, *Sympis* Guenée, *Thalatta* Walker, *Tinolius* Walker, *Zethes* Rambur.

The majority of the species examined come into Group B IV (Part III, page 62), or into Division C (Part IV, page 303), with no marked difference from the Catacolinae, except that the abdominal spiracles are sometimes very small.

The larva of *Lyncestis amphix* Cramer is in Group A II (Part II, page 243), assuming that my material is correctly identified. The rather peculiar larva of *Donda ornata* Moore is described in Part IV, page 310, and falls into Group A VI ; in this species and in *Rhesala* VII is bisetose on A 1. *Bocula* and *Oglasa* are in Group B I.

Group B I.

Genera examined : *Acontia* Ochsenheimer ; *Amyna* Guenée, *Androlymnia* Hampson, *Bocula* Guenée, *Chasmina* Walker, *Elydna* (*transversa* Walker), *Oglasa* Walker, *G. 5664* (not identified).

Larvae of Group B I are discussed in Part I, page 65, and two more species are described in Part IV, page 311. The prolegs of A 3 and A 4 are either both absent or very small and equal. Crochets of the other prolegs appendiculate and homoideous but heteroideous in *G. 5664*. Setal group VII is trisetose on A 1 and A 2 except in *G. 5664*, where it is bisetose on A 1.

This group, based on larvae of species dispersed by Hampson in four different subfamilies was at first suggested as at least a convenient "identification group." I have since examined the pupae, and their structure supports the suggestion that this is a natural subfamily with the exception of *G. 2664*, the larva of which is peculiar in having heteroideous crochets.

The majority of the species feed on plants of the Order Malvales (Malvaceae, Sterculiaceae, Tiliaceae), but one species of *Amyna* (*octo* Guenée) feeds on Amarantaceae and Chenopodiaceae and *Elydna transversa* Walker on *Schleichera* (Sapindaceae).

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